Pump Controller Type ABS PC 441

Installation Guide

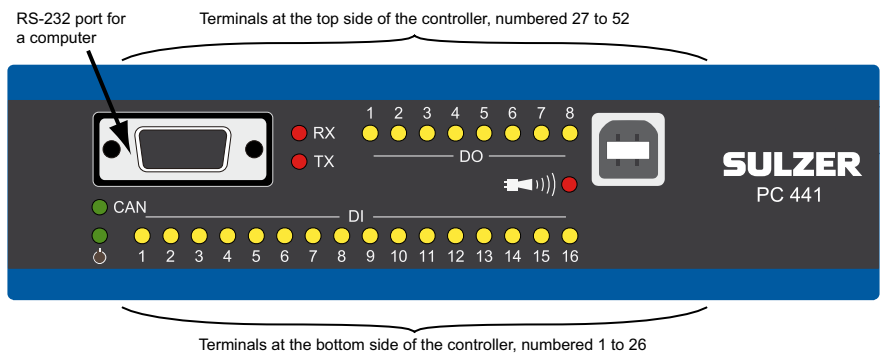**www.sulzer.com**

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1 INSTALLATION

1.1 *Mount the controller*

Mount the controller on a 35 mm DIN rail. The physical dimensions of the controller is: 86 x 160 x 60 mm (3.39 x 6.30 x 2.36 inch) (H x W x D). If it doesn't easily snap onto the rail, you can pull the small tab at the bottom side of the unit, using a small screwdriver.

1.2 *Make all connections*

There are a total of 48 terminals that may be connected to power, sensors, switches, relays and a modem; these terminals are numbered from 1 to 52 according to the following figure:

RS-232 port for a computer

Terminals at the top side of the controller, numbered 27 to 52

Terminals at the bottom side of the controller, numbered 1 to 26

WARNING Ensure that **all power is off**, and that **all** output devices to be connected to the controller also are turned **off** before you connect anything!

Table 1 shows all connections to terminals 1-26 at the bottom side of the controller. The usage of the configurable *Digital In* and *Analogue In* shown in the table is the default configuration.

"Digital In" means a signal that is either *on* or *off* — *high* or *low*, where *high* is between 5 and 34 volts DC. *Digital In* may be connected to either passive devices, such as switches, or active devices that are powered and deliver signals. Figure 1 shows how to connect such devices to the *Digital In* terminals.

Table 2 shows all connections to terminals 27–52 at the top side of the controller. The usage of the configurable *DO 1* to *DO 8* and *AO 1* to *AO 2* shown in the table is the default configuration. "DO" stands for "Digital Outputs", which are voltage outputs.

The power must be DC between 9 and 34 volts. Figure 2 shows how to connect a power-fail switch to *Digital In 3* (terminal 5) and how to connect a battery pack for uninterrupted operation.

The modem should be connected according to Figure 8.

For CAN bus (Field bus) see section 1.3 Can bus.

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Table 1.   Terminals at the bottom side of the pump controller

Factory Settings	Name[i]		#
Voltage supply, 10–32 V DC $\Rightarrow$	V+	⊘	1
	V -	⊘	2
Overflow level	Digital In 1	→ ⊘	3
HIgh level float	Digital In 2	→ ⊘	4
Power failure	Digital In 3	→ ⊘	5
Personal in station (local mode)	Digital In 4	→ ⊘	6
Motor protector pump 1	Digital In 5	→ ⊘	7
Pump 1 not in auto	Digital In 6	→ ⊘	8
Spare pump 1	Digital In 7	→ ⊘	9
Motor protector pump 2	Digital In 8	→ ⊘	10
Pump 2 not in auto	Digital In 9	→ ⊘	11
Spare pump 2	Digital In 10	→ ⊘	12
Motor protector pump 3	Digital In 11	→ ⊘	13
Pump 3 not in auto	Digital In 12	→ ⊘	14
Spare pump 3	Digital In 13	→ ⊘	15
Motor protector pump 4	Digital In 14	→ ⊘	16
Pump 4 not in auto	Digital In 15	→ ⊘	17
Low level float	Digital In 16	→ ⊘	18
			19
	V+	← ⊘	20
Level sensor	Analogue In[ii] 1	→ ⊘	21
P1 Motor current	Analogue In[ii] 2	→ ⊘	22
P2 Motor current	Analogue In[ii] 3	→ ⊘	23
P3 Motor current	Analogue In[ii] 4	→ ⊘	24
P4 Motor current	Analogue In[ii] 5	→ ⊘	25
	V-	⊘	26
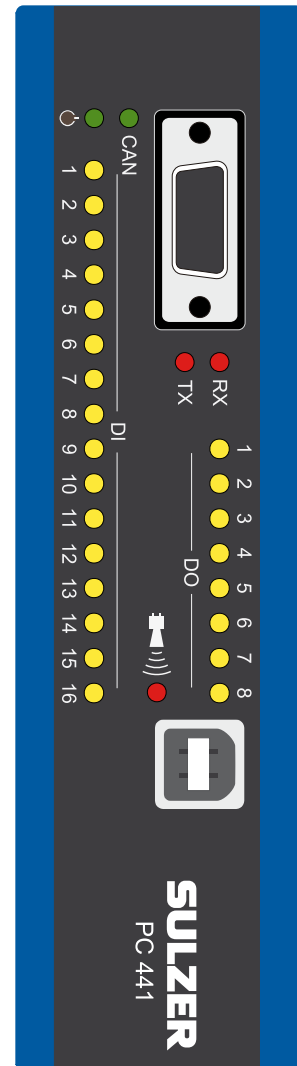
i.   "Digital In" means a signal that is either on or off (high or low), where high is anything between 5 and 32 volts DC and low is anything below 2 volts. All digital inputs are configurable in the menu *Settings > Digital Inputs*, but the configuration shown here is the default one.

ii.   "Analogue In" means Analogue Input. They are all sensing the current in the range 4–20 mA or 0–20 mA. This is configured in the menu *Settings > Analogue Inputs*.

Figure 1.   The *Digital In* terminals may be connected to either passive devices, such as switches, or active devices that are powered and deliver signals. Connect devices according to the figure.
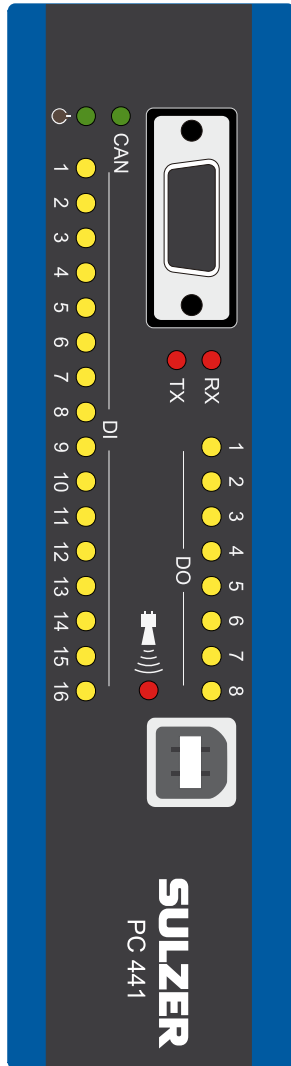

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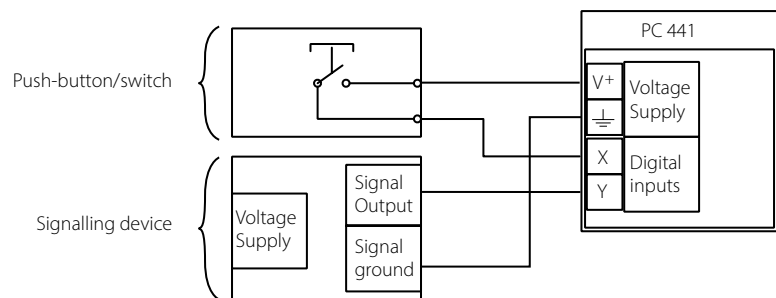
Table 2. *Terminals at the top side of the pump controller*

#			Name[i]	Factory Settings
27	⊘	V -	0V	
28	⊘	→	DO[i] 1.	Alarm alert
29	⊘	→	DO[i] 2.	Pump 1
30	⊘	→	DO[i] 3.	Pump 2
31	⊘	→	DO[i] 4.	Pump 3
32	⊘	→	DO[i] 5.	Pump 4
33	⊘	→	DO[i] 6.	Personal alarm alert
34	⊘	→	DO[i] 7.	Relay Mixer
35	⊘	→	DO[i] 8.	High level
36				
37	⊘	→	+ AO[ii] 1.	Pit level
38	⊘	←	- AO[ii] 1.	
39	⊘	→	+ AO[ii] 2.	Off
40	⊘	←	- AO[ii] 2.	
41				
42	⊘	V +↔	CAN_V+	
43	⊘	↔	CAN_H	
44	⊘	⏚ ↔	CAN_SHLD	
45	⊘	↔	CAN_L	
46	⊘	V -	0V	
47				
48	⊘	←	CTS	
49	⊘	→	RTS	
50	⊘	→	TX	
51	⊘	←	RX	
52	⊘		0V	

i. DO means Digital Output. It is a voltage output. See the menu *Settings > Digital Outputs* for configuration of these outputs.

ii. AO means Analogue Output. See *Settings > Analogue Outputs* for configuration of these outputs.

Figure 2. The power must be DC between 9 and 34 volts, but if it also charges batteries, it should be 27.2 V.

Connect a power-fail switch to *Digital In 3* (terminal 5) according to the figure.

For uninterrupted operation in case of power failure, connect a battery pack according to the figure.
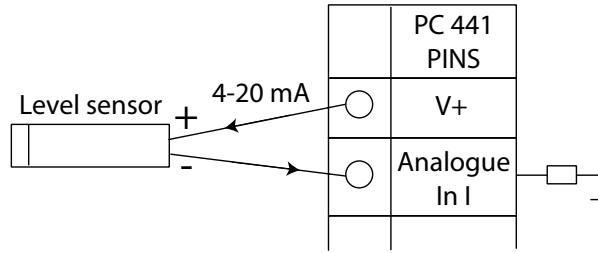

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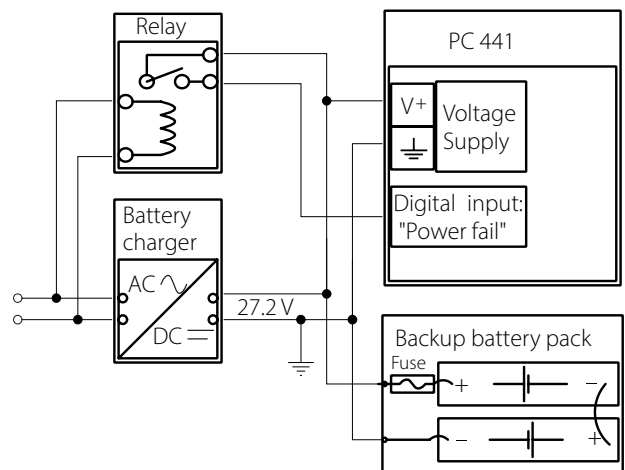
Figure 3.   Analogue input connection (level sensor)
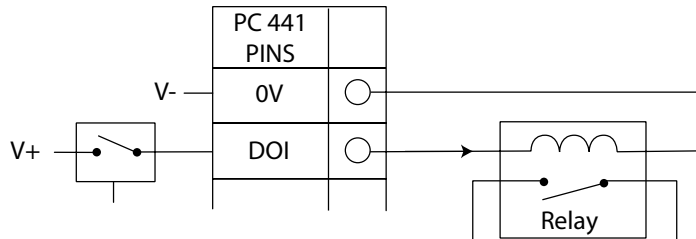

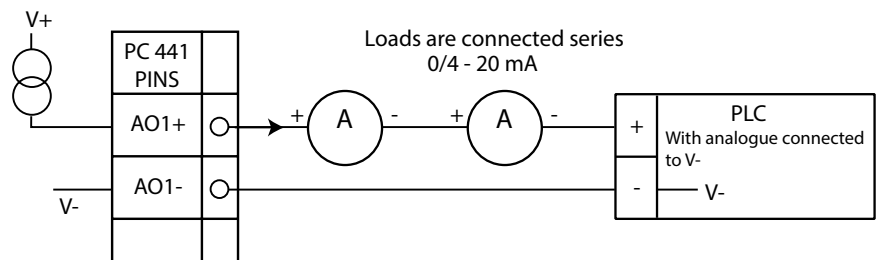*Figure 4.*   Digital output connection (external relay)

Figure 5.   Analogue output connection

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1.3 CAN bus (Field bus)

A CAN network is of multidrop type witch means that all units are connected in parallel on the same cable. PC 441 is the master on the bus to which display devices like CA 511 and any monitoring devices are connected (type CA 441 / 442 / 443).

The CAN cable uses 5 wires. Two wires are used for communication CAN_L and CAN_H. One wired is shield CAN_SHLD and two wires are used as bus power V+ and 0V. Bus power allow devices to get power directly from the bus.
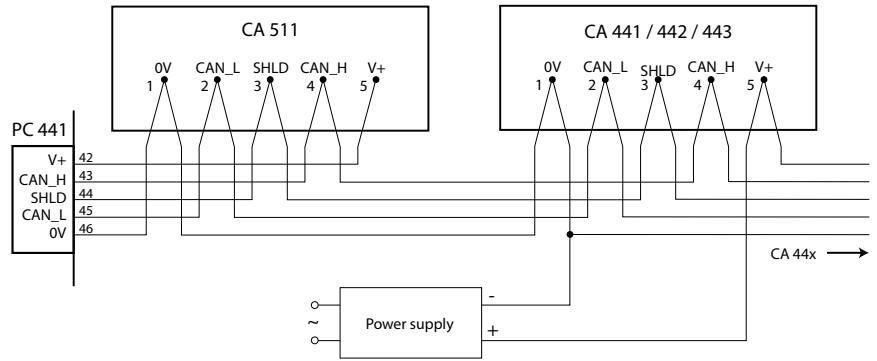
Figure 6. CAN connection

1.3.1 Using bus power

Max bus power output from PC 441 is 350 mA (V+). CA 511 can be bus powered directly from PC 441. Other modules must use an external power supply.

A few rules:

□ If CA 511 is the only device connected on the bus. Bus power CA 511 directly from PC 441.

□ If other devices (like CA 441 ..) also are connected. Don't use bus power from PC 441 for these devices. Connect an external power supply (V+ and 0V) to the first device in the chain.

□ If some modules are placed far away from the main unit, it's a good idea to use a separate power supply for these units.

1.3.2 CAN termination

The CAN bus shall be terminated at both cable ends.
PC 441 is bus master and has a built-in termination that are always active and should therefore always be placed in one of the endpoints of the cable.
For other devices you can activate the selectable termination with a switch marked CAN TERM
Active termination for the device placed on the other endpoint of the cable.
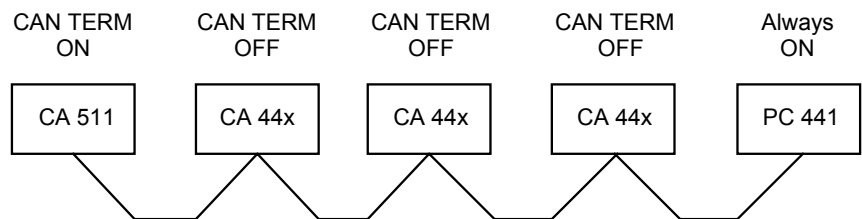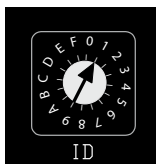All other devices between should have their termination switch in Off position.

Figure 7. CAN network with connection

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1.3.3 *CAN ID*

In a CAN network every unit must have a unique address or ID-number.
PC 441 and CA 511 use a fixed ID on the bus and no ID settings are needed for these devices.

On the CA 44x one part of the address is set default depending on device, the other part of the address is set by a hexadecimal switch, marked "ID". Choose address by pump number as in table below or instructions in system manual. If the device has a unique address and contact with the network master, the CAN LED is still green. For error codes of the CAN LED see system manual.

When used with PC 441 use the following addresses to achieve correct functions.

Table 3.   CA 441 Leakage Monitor

CAN SUB ID	Monitoring function
0	*Not used with PC 441*
1	Pump 1 or pumps 1-4
2	Pump 2
3	Pump 3
4	Pump 4
5 - > F	*Not used with PC 441*

Table 4.   CA 442 Temperature Monitor

CAN SUB ID	Monitoring function
0	*Not used with PC 441*
1	Pump 1 or pumps 1-4
2	Pump 2
3	Pump 3
4	Pump 4
5 - > F	*Not used with PC 441*

Table 5.   CA 443 Power Monitor

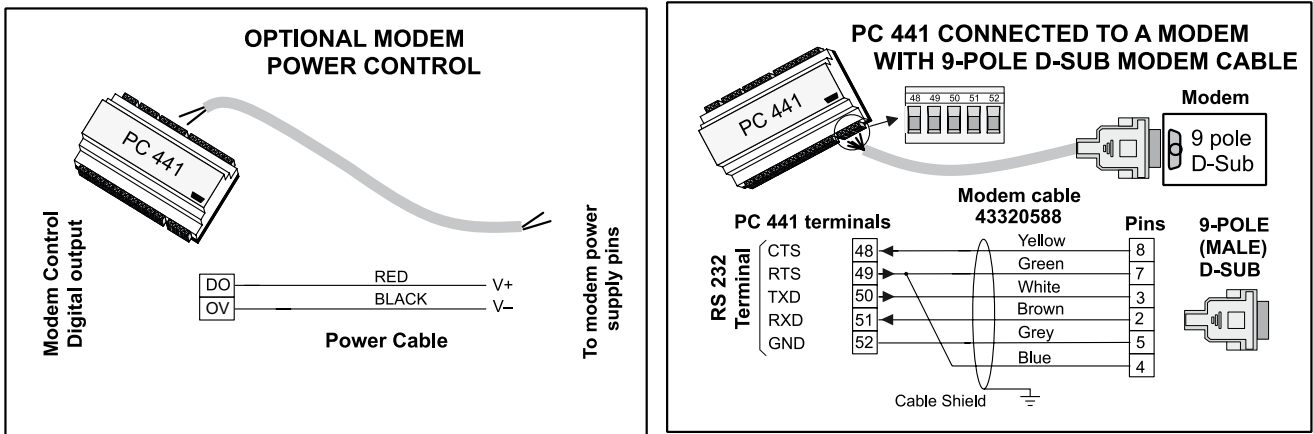| CAN SUB ID	Monitoring function
0	Main power monitor
1	Pump 1
2	Pump 2
3	Pump 3
4	Pump 4
5 - > F	*Not used with PC 441*

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Figure 8. Depending on the type of modem, connect according to the figure. Modem cable 43320588.

2 CONNECTION OF XYLEM PUMPS TO ABS PC 441

It is possible to connect Xylem pumps in parallel with ABS pumps.

For connection of sensors there are three cases depending on sensor configuration in the pump.

Case A: CLS sensor or combination of sensors in series

In this case you have to use the analog inputs on the PC441. For advanced motor current monitoring or if out of analog inputs on the PC 441 use the CA 443 module for current monitoring. See the CA 44x *Installation Guide*.

If the sensors are not connected in series, connect the sensors to temperature and leakage monitors respectively, see case B and C below. However the CLS is always connected to an analog input of the PC 441.

ATTENTION! In this case feeding power must not exceed 13.7 volts DC at any time.

Overvoltage can cause permanent damage to the pump controller. Ideal power is between 11.5 and 13.7 Volts DC

Pay special attention to the polarity of the CLS. Faulty connection will cause none or malfunction.

Select input type "ITT MiniCas Sim" on the PC 441 for this functionally.
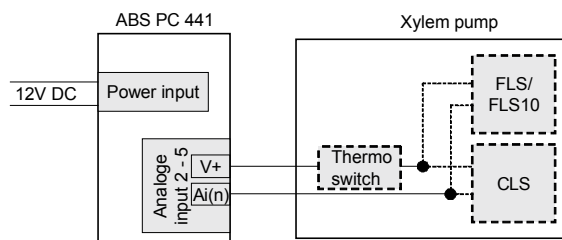
CLS or
any combination of sensors like:
•CLS and FLS or
•CLS and Thermo switch or
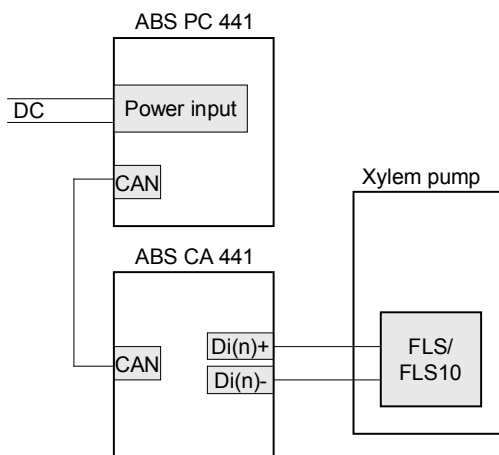•Thermo switch and FLS
•CLS and Thermo switch and FLS

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Case B: Only temp sensors

Chose "Klixon" Thermo switch/PTC or "Pt100" mode in the settings menus for CA 442

ABS PC 441

DC — Power input

CAN

Xylem pump

ABS CA 442

CAN — T(n)+ / T(n)- — Klixons/ Pt100
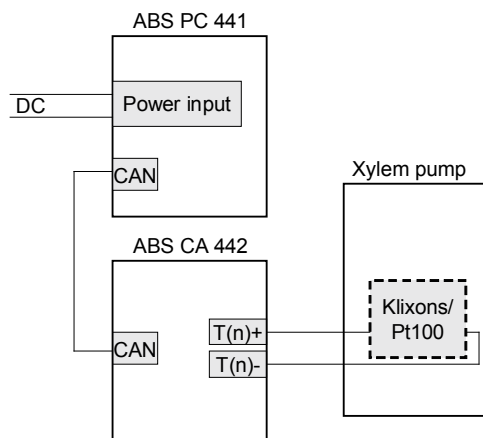
Case C: Only leakage sensors from the FLS series

Chose "Xylem" mode in the settings menus for CA 441.

ABS PC 441

DC — Power input

CAN

Xylem pump

ABS CA 441

CAN — Di(n)+ / Di(n)- — FLS/ FLS10

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3   TECHNICAL DATA

3.1   *Technical data PC 441*

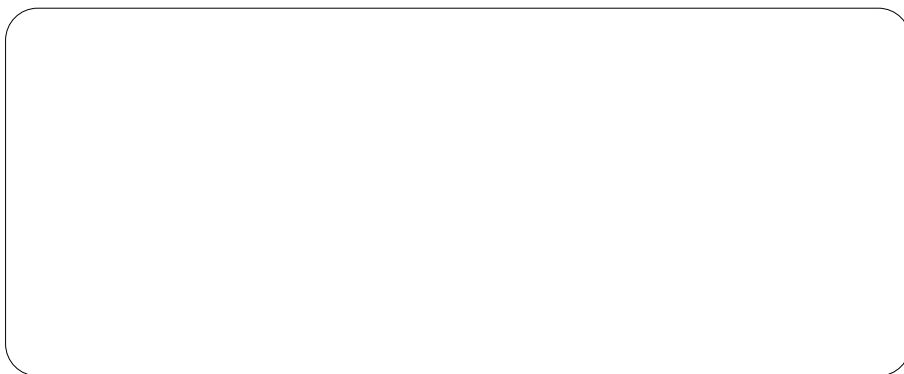|	
Ambient operation temperature	-20 to +50 °C (-4 to +122 °F)
Ambient storage temperature	-30 to +80 °C (-22 to +176 °F)
Degree of protection	IP 20, NEMA: Type 1
Housing material	PPO and PC
Flame rated	V0 (E45329)
Pollution degree	2
Mounting	DIN Rail 35 mm
Dimension	HxWxD: 86 x 160 x 60 mm (3.39 x 6.30 x 2.36 inch)
Humidity	0-95 % RH non condensing
Power supply	9-34 VDC SELV or Class 2
Power consumption	< 5.0 W (without digital output load)
Installation category	CAT II
Digital outputs Max load	8 DO. Positive logic. Sourcing from power supply. 1A/output. Max total current for all 8 outputs together is 4 A.
Digital inputs Input resistance Input voltage	16 DI. Positive logic 10 kohm 5-34 V . Trig level ~ 4 V
Max pulse rate digital in 13-16	500 Hz (pulse channels)
Analogue outputs Max load Resolution Current limit	2 AO. 0/4-20 mA Sourcing from power supply 500 ohm@12 V, 1100 ohm@24 V 15 bits 0.5 uA ~22 mA
Analogue inputs Input resistance Resolution	5 AI. 0/4-20 mA 136 ohm. PTC protected AI1 :15 bits (level sensor). AI2-5 : 10 bits
Communication ports	1 RS232 Service port 1 RS232 port for telemetry interface (modem) 1 USB2 Service port
Field Bus (to CA 511/CA 441 ....)	1 CAN Port . Max current load 350 mA
Max altitude	2000 m
Approval	CE CSA c us

3.2   *Cleaning*

How to clean the unit

Power off the unit. Only outside/front shall be cleaned by using a dry, soft cloth. A good choice would be the microfiber type of cloth. Gently wipe the PC 441 front in order not to scratch the overlay. If the dry cloth did not completely remove the dirt, do not press harder in an attempt to scrub it off. If necessary, moisten the cloth by adding a small amount of water with thin solution of mild detergent and try again. Never use detergent with polish or solvent which can have an impact of the plastic surface.

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